



AF 11774

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No. 46271

In re patent application of

Nakatani et al.

Serial No. 09/933,668

Filed: August 22, 2001

For: INK-JET RECORDING MATERIAL

Group Art Unit: 1774

Examiner: Dicus, Tamra

FILED UNDER RULE 1.116
EXPEDITED PROCEDURETRANSMITTAL OF RESPONSEAssistant Commissioner for Patents
Washington, D.C. 20231

Sir:

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APR 16 2003

TC 1700

Transmitted herewith is an Response in the above-captioned application. The fee has been calculated as shown below. *(Small entity fees indicated in parentheses.)*

CLAIMS AS AMENDED							
(1)	(2)	(3)	(4)		(5)	(6)	(7)
	Claims Remaining After Amendment		Highest Number Previously Paid For		Extra Claims	Rate	Fee
Total Claims	13	-	20			18.00	0
(Small Entity)						(9.00)	
Independent claims	1	-	3			84.00	0
(Small Entity)						(42.00)	
Multiple Dependent	0	-	0	0		280.00	0
(Small Entity)						(140.00)	
Extension of Time	One Month		Two Months		Three Months		
Fee	\$110		\$410		\$930		\$0
(Small Entity)	(\$55)		(\$205)		(\$465)		0
Total							\$0

The above fees are believed to be correct. However, the Commissioner is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 50-0687 under the above Attorney Docket Number for which purpose this paper is submitted in duplicate. **CUSTOMER NO. 20736**

Respectfully submitted,

Paul E. White, Jr.
Reg. No. 32,011
Tel. No. 202-261-1050
Fax No. 202-887-0336Date: **April 15, 2003**Manelli Denison & Selter, PLLC
2000 M Street, N.W.
Suite 700
Washington, D.C. 20036-3307
202.261.1000



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION of
NAKATANI et al.

Application No.: 09/933,668

Filed: August 22, 2001

FOR: INK-JET RECORDING MATERIAL7

Group Art Unit: 1774

Examiner: Dicus, Tamra

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APR 16 2003

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AMENDMENT

Hon. Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

In response to the Office Action dated January 16, 2003, reconsideration and allowance are respectfully requested in view of the attached English translation of the priority document and the following remarks.

With respect to the Office Action at page 5, the applicants respectfully traverse the rejection of claims 1-14 under 35 USC 103(a) over Kaneko et al. in view of Romano et al. and further in view of Kojima et al. Please be aware that claim 6 was previously cancelled. None of the cited references make the presently claimed invention to be obvious.

However, the applicants note that US Publication 2001/0004487 to Kaneko et al. has a publication date of June 21, 2001 and filing date of December 19, 2000. The present application claims priority to Japanese Application No. 2000-252650, with filing date of August 23, 2000. The U.S. Patent and Trademark Office (PTO) has acknowledged in the Office Action dated July 2, 2002, the

applicant's claim of priority for the subject application and has acknowledged receipt of the certified copy of the priority document. The applicants submit with this Response a verified English translation of the priority document, Japanese Application No. 2000-252650 (enclosed herewith) in order to perfect their claim of priority. The filing date of the applicant's priority document, August 23, 2000 is prior to both the publication date of June 21, 2001 and filing date of December 19, 2000 for the cited reference of Kaneko et al., US Publication 2001/0004487. Accordingly, the applicants request that the reference of Kaneko et al. be withdrawn.

The applicants respectfully traverse the rejection of claims 1-12 under 35 USC 103(a) over Kojima et al. in view of Kobayashi et al. and http://www.paperloop.com/pp_mag/paperhelp/2_3_6.shtml ("Paperloop"). Please be aware that claim 6 was previously cancelled. Pending claims 13 and 14 are not rejected.

Importantly, the ink-jet recording material of the presently claimed invention has an ink-receptive layer containing fumed silica with an average primary particle size of 5 to 50 nm and a hydrophilic binder on a support comprising a polyolefin resin-coated paper. This ink-receptive layer uses fumed silica having an average primary particle size of 5 to 50 nm, resulting in a material with excellent ink-absorption and glossiness. However, the ink-receptive layer is likely to have surface flaws.

In an ink-jet recording material using a polyolefin resin-coated paper as a support, as in the presently claimed invention, a printed image is observed by

reflected light. Accordingly, it is preferred for the surface to have high glossiness, but with higher glossiness, the flaws on the surface of the ink-receptive layer are more noticeable.

As stated above, by using fumed silica having an average primary particle size of 5 to 50 nm, high glossiness can be obtained but with flaws likely on the surface of the ink-receptive layer.

By using a polyolefin resin-coated paper, higher glossiness can be obtained as compared with that of a conventional paper support.

Therefore, by using a polyolefin resin-coated paper and fumed silica in combination, glossiness can be greatly improved, but flaws are more likely caused on the surface of the ink-receptive layer. This problem cannot be solved by employing conventional polyolefin resin-coated paper.

The surface flaw problem can be solved by satisfying all the requirements recited in present claim 1.

This is proved by the descriptions of the working Examples in the present specification. The material in Comparative example 1 has a thickness B for the polyolefin resin layer at the surface on which the ink-receptive layer is provided and the resulting value $(B+C)/A$ is out of the scope of the presently claimed invention. The material of Comparative example 2 has a density of the base paper which is out of the scope of the presently claimed invention, as shown in Table 1 on page 26 of the present specification. Additionally, flaws are markedly generated at the surface of the ink-receptive layer, as shown in Table 2 on page 27 of the specification. By contrast, in the ink-jet recording materials of the

presently claimed invention, flaws do not occur or even if generated, the degree of flaw is little.

In the reference, Kojima, many support materials for ink jet recording sheet have been described, for example, at column 9, lines 8-17. Among these, there are mentioned water-absorptive supports (non-coated paper, coated paper, etc.), non- water-absorptive supports (plastic films, polyolefin resin-coated paper, etc.), an opaque support (non-coated paper, coated paper, polyolefin resin-coated paper, etc.) and a transparent support (plastic films).

At column 7, lines 66-67 of Kojima, the thickness of the resin layer of the resin-coated paper is disclosed to be preferably 5 to 50 μm . In the presently claimed invention, only an ink-jet recording material using a polyolefin resin layer with a thickness of 5 to 25 μm accomplishes the above discussed objects of the present invention and when a polyolefin resin layer thicker than 25 μm is used, no effect of the present invention can be obtained.

Such new and unexpected results are clearly shown in the present specification wherein the ink-jet recording material of Comparative example 1 using a thickness (B) of the polyolefin resin layer of 27 μm has significant flaws as shown in Tables 1 and 2 on pages 26 and 27 of the present specification.

In Kojima, there is no disclosure of the density of the base paper of the polyolefin resin-coated paper. According to the Paperloop reference, the relation between bulk and density of paper is described. Paperloop discloses that bulk is the reciprocal of density and bulks of various kinds of papers are exemplified therein. For example, there are exemplified by dense paper (bulk is 0.8 cm^3/g ,

density is 1.25 g/cm^3) to tissue grades (bulk is $3\text{-}10 \text{ cm}^3/\text{g}$, density is $0.33\text{-}0.1 \text{ g/cm}^3$). That is, density is exemplified by the range from 1.25 g/cm^3 to 0.1 g/cm^3 .

In Paperloop, the density of paper is described with a wide range and thus, the specified range of the base paper according to the present invention is also included in the wide range.

However, the applicants submit that a person of ordinary skill in the art would not be able to select a specific range which can accomplish the object of the present invention when it is applied to a base paper of a polyolefin resin-coated paper from the wide range of density described in Paperloop.

The Examiner stated on page 3, lines 18-21 of the Office Action that “Basis weight and thickness directly effect density. Essentially, the thicker the paper, the higher the density, ...”

A unit of density is g/cm^3 , and thus, it is measured by weight per unit volume. Accordingly, as pointed out by the Examiner, weight and thickness (which proportions to volume) directly effect density. However, with regard to the comments that the thicker the paper, the higher the density, it would be not true and the following is generally known.

According to Paperloop, bulk is g/cm^3 , and is the reciprocal of density. In other words, bulk is a volume per a unit gram, and the bigger the bulk, the greater the thickness. Thus, bulk per unit gram proportions to the thickness. To the contrary, as mentioned above, bulk is in inverse proportion to the density. Therefore, a thickness of paper per unit gram is in inverse proportion to the density of paper.

The presently claimed invention does not define a basis weight of paper but defines the density of a base paper. In general, the cost of paper is determined by a basis weight. Accordingly, even when paper is made thin, if the basis weight is the same, the cost is the same. Therefore, a person of ordinary skill in the art would not be motivated to obtain lower density for the reason of reducing cost.

In Kojima, there is no description to use fumed silica in an ink-receptive layer. Also, as described above, various kinds of support materials are described in Kojima. Polyolefin resin-coated paper is only one of these support materials. Accordingly, in Kojima, the problem of the present invention never occurs, i.e., when an ink-receptive layer containing fumed silica having an average primary particle size of 5 to 50 nm is provided.

The reference of Kobayashi et al., discloses an ink-jet recording material in which a colorant-receptive layer containing silica fine particles is provided on a transparent support. This recording sheet is a transmissive type material and observed by a transmittant light (see column 1, lines 5-11 of the reference).

In contrast, the polyolefin resin-coated paper of the presently claimed invention is an opaque support. Thus, the ink-jet recording material of the presently claimed invention is a reflection type and a printed image is observed by reflected light.

The required characteristics for a recording material in Kobayashi when using a transparent support compared to the presently claimed invention using a polyolefin resin-coated paper, are quite different from each other. In particular,

glossiness and flaws of an ink-receptive layer are extremely important for the reflective type material. However, in a transmissive type material, glossiness has no meaning for such a material, and even when there are flaws on the surface of the ink-receptive layer, they are not particularly noticeable. Accordingly, the problem of the present invention does not exist in Kobayashi using a transparent support.

As explained in detail above, the problem of the present invention does not exist in either of Kojima or Kobayashi. Accordingly, there is no motivation to combine these references and to expect the constitution of the present invention.

The applicants assert that a person of ordinary skill in the art would not consider the combination of Kobayashi or Paperloop with Kojima when contemplating the presently claimed invention. There is no suggestion or motivation to combine the secondary references with the primary references to result in the presently claimed invention. Accordingly, the applicants submit that the combination of references is not tenable and should accordingly be withdrawn.

Even if the combination of references were considered, then such combination would not make the presently claimed invention to obvious for the numerous reasons discussed above.

For example, if the teachings of Kojima and Kobayashi are considered, the polyolefin resin-coated paper of the presently claimed invention is not present (i.e., not described in Kojima), so that the ink-jet recording material of the present invention cannot be obtained. Significantly, a person of ordinary skill in the art

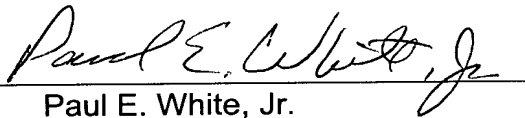
would not find the polyolefin resin-coated paper of the presently claimed invention to result from Kojima and Paperloop.

Thus, the applicants submit that the presently claimed invention is fully allowable under Section 103(a) in view of the cited art.

In view of the above, it is believed that this application is in condition for allowance and a Notice to that effect is respectfully requested.

Respectfully submitted,

Manelli Denison & Selter, PLLC

By 

Paul E. White, Jr.

Reg. No. 32,011

Tel. No.: (202) 261-1050

Fax No.: (202) 887-0336

2000 M Street, N.W.
Seventh Floor
Washington, D.C. 20036
(202) 261-1000